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AUTHOR Oakerson, Ronald J.
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ABSTRACT

Jurisdictional consolidation of local governments and school districts is a controversial and persistent subject for rural communities. Consolidation proposals are usually based on the assumption that larger jurisdictions are necessary to capture economies of scale. This paper argues that the effect of size depends on the function that a jurisdiction performs and the multi-organizational structure in which a jurisdiction is embedded. Local governments perform two types of basic functions, i.e., provision (articulating needs) and production (transforming resources into goods and services). Studies of police departments (a production function) found that department size was positively related to per capita spending but negatively related to residents' perceptions of police effectiveness and attitudes. Although increasing school district size increases certain inputs to the production of education, research does not show that larger size leads to higher output (student achievement). Smaller school districts may have access to resources (such as greater "social capital") that compensate for lower-level inputs. The production and provision of services in rural areas may be limited, not by smaller jurisdictional size, but by a smaller local public economy, which yields less complexity in organizational structure and less flexibility for operating at diverse scales. In these circumstances, consolidation offers no solution to rural problems. Consolidation cannot create population scale (a function of density) where it is absent, and may, by mixing together different communities of interest, diminish valuable social capital. (SV)

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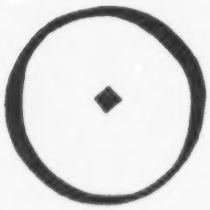
Size, function, and structure: Jurisdictional size effects on public sector performance

Ronald J. Oakerson*



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Jurisdictional consolidation of local governments and school districts is a subject that persistently arises in discussions of rural communities. Many local public jurisdictions in rural areas are small, measured by population size, and getting smaller. Rural consolidation proposals are generally driven by a concern with service costs, based on an assumption that there are economies of scale that only larger jurisdictions can capture. They may also reflect a concern with disparities in wealth, in the belief that a larger jurisdiction can both draw on a wider tax base and distribute revenue more equitably. It is important, therefore, to consider what is known about the effects of jurisdictional size on public-sector performance, as well as how this knowledge might apply in rural communities.

In the history of American public administration no topic has been more controversial than jurisdictional size. The wisdom of consolidation has often been accepted as an article of faith by academics and practitioners alike. Beginning early in the century and extending well into the 1960s, the professional study and practice of public administration was closely identified with a consolidation movement aimed at eliminating the vast majority of local governments in the United States. The only substantial "success" achieved was a sharp reduction in the number of independent school districts, down from more than 128,000 in 1932 to less than 15,000 in

*Indiana University

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1987. During the same period, the number of municipalities grew by 17 percent from 16,000 to 19,000 and the number of special purpose districts more than doubled, leaping from 14,500 to more than 29,000. Reform efforts have often been directed at metropolitan areas, where suburban growth has frequently been accompanied by an increase in the number of municipalities and special districts.

Nearly 62 percent of the total number of local governments in the United States, however, lie outside Metropolitan Statistical Areas (MSAs), compared to 22.5 percent of the U.S. population (see Table 1). Clearly, the number of local governments per capita is greater in non-metropolitan than in metropolitan America. The majority of small local governments are rural. For example, Janet Fitchen (1991, p. 5) reports that the 3 million people who live in the rural portion of New York State (17 percent of the state's population, in 44 of the state's 62 counties) are served by a large number of small local governments:

> There are 727 townships in rural New York, each with a governmental structure and municipal functions and responsibilities, and 324 incorporated villages. Some municipalities contain very small populations: One township has under 100 people; over 180 villages have populations under 1,000. One whole county contains only 5,000 people, and thirteen more have fewer than 50,000 people. And despite waves of consolidations forced by financial considerations, state pressures, or both, there are still ninety-one hospitals in the forty-four rural counties, and around 300 rural school districts, including some with fewer than 300 children in the entire school, kindergarten through twelfth grade.

Until roughly 20 years ago, there was little systematic research on jurisdictional size effects. There was instead a professional belief system that supported consolidation efforts unambiguously. More recently, a decentralization or community-control movement arose to challenge the more conventional view. The alternative has attracted as little practical political support inside established large jurisdictions (such as central cities) as the consolidation movement has found among the small jurisdictions of the suburbs and rural areas.

In the early 1970s, the Workshop in Political Theory and Policy Analysis at Indiana University began extensive empirical research focusing on the effect of size on police protection—a local public service of high salience in urban America—as a way of testing key propositions, related to size, derived from alternative theoretical perspectives (E. Ostrom 1972). More recently, the Advisory Commission on Intergovernmental Relations (ACIR) has conducted intensive case studies of two complex metropolitan counties—St. Louis County, Missouri, and Allegheny County (Pittsburgh), Pennsylvania—examining, among other issues, the role and function of small units of government in metropolitan areas (ACIR 1988, 1992). Other scholars, operating from congruent theoretical perspectives, have examined the effect of school district size on student performance.

These investigations are summarized below. The central argument used to frame this summary is that the effect of size depends on (a) the *function* that a jurisdiction performs and (b) the multiorganizational *structure* in which jurisdictions are embedded.

Table 1. Number of local governments inside and outside metropolitan statistical areas, 1987.

	Outside MSAs	Inside MSAs
Counties	2,307	735
Municipalities	11,712	7,488
Townships	11,655	5,936
School Districts	8,746	5,975
Special Districts	16,842	12,690
All governments	51,262	31,924
Dependent School Districts	653	839
Population	54,399,500	186,637,900

Source: 1987 Census of Governments.

Functions: Provision and production

The basic functions of local governments with respect to local public goods and services can be sorted into two: provision and production (V. Ostrom, Tiebout, and Warren 1962; Oakerson 1987; ACIR 1987). Provision refers to the process of articulating and aggregating local demand for goods and services; it is the work of citizens, their elected representatives, and (in part) agents such as city managers, all of whom participate in making the following decisions:

- What goods and services should be publicly provided?
- What private activities should be publicly regulated?
- How much public revenue should be raised, and how?
- What quantities of each good or service should be provided and what quality standards should apply?
- Who should produce these goods and services?

Production is the process of transforming resource inputs into desired outputs. It is the work of police driving or walking a beat, teachers in the classroom, and garbage collectors riding the truck, along with the work of their supervisors and managers.

Service production can also be sorted into two types: the production of direct services and production of indirect or auxiliary services (see E. Ostrom, Parks, and Whitaker 1978). Direct services are those supplied directly to citizen-consumers, while indirect services, also called auxiliary or support services, are supplied to the producers of direct services, and thus only indirectly to citizen-consumers. Virtually all local public services, such as police, fire protection, education, streets, and sewers, are composed of a number of different components, direct and indirect.

These functions are not only distinguishable, but also separable. Provision and production can be carried out by different, autonomous organizations. The legal powers required to provide a public service, such as the power to tax, may not be required to produce the service. At the same time, production may require knowledge and skill not required in provision. Provision and production can be linked in a variety of ways: (1) in-house production by the provision unit, (2) production by an overlapping jurisdiction, (3) contracting with either another public agency or a private firm, and (4) production by citizen volunteers. Each of these options applies to any of several service components, so that a provision

unit can choose in-house production for one or more direct-service components, utilize citizen volunteers for other components, and contract out for various indirect-service components with a variety of public and private agencies. Local governments become participants in a local public economy that offers a variety of options for both provision and production of services.

Pure provision units

Many of the smallest local governments in the U.S. are "pure" provision units—jurisdictions that function only to provide, not to produce, services (ACIR 1987, pp. 18-20). An ACIR study of St. Louis County, Missouri, a county of nearly 1 million people and 91 municipalities that lies just west of the City of St. Louis, included 22 municipalities with fewer than 1,000 residents in 1984. Twenty-one reported provision of police protection, but only 1 municipality maintained a full-time police department and 2 others employed part-time police officers. Eighteen contracted for police protection, 6 with the county police and 12 with other municipalities (ACIR 1988, p. 56). Similarly, 18 of 22 reported provision of street maintenance, but only 1 out of 10 responding to a survey produced any street maintenance services in-house, while 9 out of 10 contracted with various private producers (ACIR 1988, p. 86).

Small municipalities in St. Louis County are greatly outnumbered as "pure providers" of residential street maintenance by private subdivisions. In addition to the 18 municipalities noted above, there are some 427 subdivision associations, located in another 27 municipalities, that own their streets and make provision for maintenance, while contracting for production with a combination of overlying municipal street departments and private firms (ACIR 1988, pp. 81-92). Many subdivisions use their powers of ownership to control access to their neighborhood, often chaining off streets to reduce cross traffic

Anthony Downs (1976) has argued that the planning and procurement of public services should be separated from production and delivery in order to avoid commingling producer and consumer interests. Municipal officials who organize and supervise their own police departments or street departments, in this argument, are unable to represent citizen-consumer interests as fully as they might because of partially conflicting producer interests. Both small local governments and private subdivisions functioning as pure provision units satisfy Downs' prescription, and limited evidence lends support to his speculations. Data from St. Louis County suggest that contracting jurisdictions have lower costs. Police contracts tend to be negotiated at below average cost per capita, indicating that competition among producers is generating pressure toward marginal cost pricing (ACIR 1988, pp. 56-57). Available data also suggest that contracting municipalities spend less per household on street maintenance than do municipalities with their own street department, controlling for median household income (ACIR 1988, p. 87).

For many years the ACIR recommended that small, "non-performing" local governments be eliminated, suggesting that many such units existed, especially in metropolitan areas. Non-performing was equated with non-producing, and lack of production was taken as an indication of non-viability. Pure provision units are not inactive or non-performing; they simply perform a different function. They are very active in raising revenue, choosing service levels, and procuring services from various producers, whose performance they monitor and evaluate. Their viability is dependent not only on contracting, but also on the use of part-time, non-professionalized public officials, including elected mayors who tend to municipal business during evenings and on weekends. In 1987, the ACIR repealed its recommendation, recognizing the potential viability of non-producing units as providers (ACIR 1987, p. 55).

Pure provision units do depend, however, on certain structural features of the surrounding public economy—alternative service producers able to capture economies of scale and supplementary, overlying provision units able to address larger communities of interest as necessary. In St. Louis County, fire protection districts both provide and produce direct fire protection services in areas with small municipalities (as well as in unincorporated areas) and the county government provides and produces arterial street maintenance. The organization of arterial street maintenance reflects a larger community of interest than represented in any single municipality, including the larger municipalities (up to 55,000 people) found in St. Louis County.

The reliance on fire protection districts, however, is driven mostly by production considerations, principally economies of scale. Pure provision units also depend on the existence of other agencies, whether public or private, that can operate at a scale sufficient to capture scale economies. The principal incentive to contract for service production is lack of sufficient scale for efficient in-house production. Ordinarily, a large metropolitan area offers ample opportunities for such contracting. One of the major producers of contract police services in St. Louis County is a small municipality that specializes in the production of police patrol.

An alternative to larger scale, professional fire departments is to rely on smaller scale, volunteer departments, such as found in Allegheny County, Pennsylvania (ACIR 1992, pp. 47-48). Outside Pittsburgh, only 2 of 128 municipalities are served by fulltime fire departments, the remainder of the 1-million strong suburban population having organized an estimated 250 volunteer fire companies. Most of the municipalities contribute on the provision side to fire protection; some own the fire station, some pay for a fulltime driver, and many supply equipment. The bulk of the labor cost, however, is covered by the voluntary contributions of community residents, who organize production through private, non-profit community organizations.

In-house production of direct services

The most common service arrangement found in local governments is in-house production, particularly for direct services. The quality of local government performance in relation to direct services depends on the organization of both provision and production. The total effect of size on in-house production of direct services is a combination of jurisdictional size effects, many of which operate through provision, and agency size ef-

fects. The most definitive empirical work has been done on size and production of police services, followed by public education.

Police services

The Workshop in Political Theory and Policy Analysis has conducted an extensive series of studies examining the effects of department size on police services, as a test of the consolidation/community-control theses. Two basic research designs were used: (1) comparisons of a small number of socio-economically matched neighborhoods that are served by very different size departments and (2) studies of a larger number of neighborhoods served by various size departments using statistical controls for neighborhood characteristics. In both cases the comparison neighborhoods were located within the same metropolitan area. Studies of one or the other type were conducted in the Indianapolis, Chicago, St. Louis, Rochester, and Tampa-St. Petersburg areas (see V. Ostrom, Bish, E. Ostrom 1988, pp. 153-161).

For the purpose of illustration the results of one metropolitan area study are presented here before summarizing the conclusions that emerge from the entire series. The study was conducted in 44 St. Louis City and St. Louis County neighborhoods served either by the St. Louis City Police Department, the St. Louis County Police Department, or one of the much smaller municipal police departments located in St. Louis County (see E. Ostrom 1976).

Table 2 displays the standardized regression coefficients (Betas) for the relationship between size of department (measured by the number of sworn officers) and a series of performance variables. The regression equation controlled for the effects of median home values and the percentage of black residents in the neighborhood. Per capita cost was strongly and positively related to size—larger departments tend to spend more money per resident—while the percent of respondents who say that police respond "very rapidly" in their neighborhood was strongly and negatively related to size—smaller departments tend to respond more quickly to calls, at least in the perception of their residents. Smaller departments also tend to be viewed as more honest and more helpful (percent assisted by police), although these tendencies are not as strong. Smaller departments may also be somewhat more likely to be viewed by citizens as "outstanding," although this relationship was not statistically significant. At the same time, citizens served by larger departments are more likely to report having been victimized by crime and to view crime in their neighborhood as increasing—this controlling for the value of owner-occupied housing and the neighborhood's racial composition.

The St. Louis data were also analyzed to identify curvilinear size effects—the possibility that performance may increase with size over some size range, than decrease with size beyond a threshold. The results are shown in Table 3. Curvilinear effects are found with respect to the percentage of respondents assisted by police and the percentage stopped by police. Mid-size departments seem to be more active on the street than either small or large departments, with little difference between small and large. Mid-size departments also outperform both small and large in perceived response time and the percentage who rate the police as outstanding. In this case, however, small departments also outperform large departments. Small departments excel on the more subjective indicators, outperforming both mid-size and large departments in terms of police-community relations and perceived equal treatment by police.

Workshop studies have shown that smaller departments tend to allocate more resources to patrol and are able to

Table 2. Relation between police department size and performance in St. Louis city and county neighborhoods (controlling for median value of owner-occupied housing and percent black residents).

Dependent variables	Size Betas
% Victimized	.29
% Assisted by police	-.35
% See crime increasing	.42
% Say police respond very rapidly	-.64
% Rate job outstanding	-.16
% Agree police honest	-.30
Per Capita cost	.72

Note: All relationships significant at .05 level or less, except for "% rate job outstanding."

Source: Elinor Ostrom (1976), Table 3, p. 55.

Table 3: Percentage of neighborhoods in St. Louis city and county served by small, medium, or large police departments with higher than mean performance levels.

Dependent variables	Small	Medium	Large
% Victimized (below mean)	78	42	45
% Assisted (above mean)	33	67	36
% Stopped by police (above mean)	33	54	36
% Know someone mistreated (below mean)	44	46	63
% Know 1 or more police (above mean)	56	50	27
% See crime increasing (below mean)	78	58	27
% Say police respond very rapidly (above mean)	33	79	9
% Rate job outstanding (above mean)	44	67	9
% Rate police community relations outstanding (above mean)	67	50	9
% Strongly agree police honest (above mean)	56	58	9
% Strongly agree police treat all equally (above mean)	78	46	45

Note: Small = 10 fulltime officers or less. Medium = 11-76 fulltime officers. Large = 436 or 2,200 fulltime officers.

Source: Elinor Ostrom (1976), Table 7, p. 69.

achieve much greater patrol densities (on a per capita basis) even though the largest departments almost always have more sworn officers per capita (V. Ostrom, Bish, E. Ostrom 1988, pp. 160-161). This finding is consistent with citizen perceptions of higher response times by smaller departments. Consistently, in every study the Workshop has conducted, small and mid-size departments perform as well or better than large departments on a variety of performance indicators related to police patrol (V. Ostrom, Bish, E. Ostrom 1988, 0. 160). Mid-size departments perform better on some performance measures while small departments perform better on others. In general, very small and even part-time departments ordinarily play a positive role in police service delivery, complementing services available from overlying jurisdictions, such as state or county police.

Public education

The argument for consolidation of school districts has generally rested on suggested links between larger size and various intervening variables, such as spending per pupil, larger facilities, and more extensive curricula, all of which are assumed to be related positively to school performance. However, the direct effect of school-district size on student performance, measured by standardized tests, has generally been shown to be negative. Larger districts, other things equal, translate into lower levels of student performance.

A study of 97 school districts in New York State found that, controlling for expenditure levels and the family background of students, student performance declined as size of district increased (Kiesling 1967). Employing a size threshold of 2,000 students, a study of 144 unified school districts in California found that students in larger districts have lower scores on standardized achievement tests, controlling for family poverty, minority background, and community wealth (Niskanen and Levy 1974). An ACIR study in Allegheny County, Pennsylvania, using district-level performance scores (the percent passing an 8th grade achievement test), found no relationship between size and performance, but also found that many of the smallest districts (with enrollments under 1,500) perform much better than predicted by a student social-background model (ACIR 1992, pp. 58-60).

It is very important to note that while school-district consolidation is usually argued on the basis of an ability to increase certain *inputs* to the production of education, research that relates size to performance does not confirm the presumption that larger size leads to higher *output*. Smaller school districts may have access to resources and processes of education that compensate for the lower-level inputs that advocates of consolidation seek to increase. One possibility is that small districts benefit from greater "social capital" (Coleman 1989; Salamon and Davis-Brown 1990), relationships of trust and reciprocity among members of the local school community. Yet these attributes may also be affected by factors other than size. Because smaller districts often maintain smaller schools, there is a possibility that better student-teacher and student-student relationships, nurtured by the greater ease of getting to know one another and of responding productively to individual differences, may more than compensate for missing aspects of curriculum and facilities (see Barker and Gump 1964).

Table 4. Service production structures in St. Louis County and Allegheny County outside Pittsburgh

Police: Service components	St.Louis County	Suburban Allegheny County
Training	1	1
Crime lab	1	1
Major investigation	1	1
Dispatching	29	52
Patrol	66	120
Providers	91	130

Fire protection: Service components	St.Louis County	Suburban Allegheny County
Training	1	1
Dispatch	19	39
Suppression	42	~252
Providers	91	130

Public education: Service components	St.Louis County	Suburban Allegheny County
Audio visual	1	1
Joint purchasing	1	1
Special education	1	~1
Vocational technical	~5	5
Elementary secondary	23	43

Source: Roger B. Parks and Ronald J. Oakerson (1992). See also ACIR (1988, 1992).

The effects of structure

Although direct services, such as police patrol and classroom education, tend to be produced in-house, indirect or auxiliary services are frequently produced by outside agencies, public or private. Most public services are composed of various service-components, each of which can be produced separately by different agencies, yet coordinated with the production of other components. This leads in most metropolitan areas to the creation of complex service production structures that combine with size and function to affect both efficiency and equity.

Production structures

Table 4 summarizes the service production structures for police, fire protection, and public education in St. Louis County, Missouri, and suburban Allegheny County, Pennsylvania (outside Pittsburgh). The typical structure is one that combines highly differentiated production of direct services (police patrol, fire suppression, and nonspecialized classroom education) with moderately to highly integrated production of support services, depending on the particular component.

The difference between the number of "providers" and the number of "producers" of police patrol—a direct service—reflects the incidence of service contracting. Jurisdictions that do not produce patrol service are unlikely to produce any component of policing: They are

providers only. The number of dispatching units, however, is less than the number of patrol producers. Dispatch tends to be organized as a regional function, although the arrangement varies from one part of the county to another. Some departments contract with adjacent or overlying jurisdictions; others join with nearby departments to create joint dispatch centers. In Allegheny County, dispatch is sometimes produced by regional Councils of Governments. The investigation of major crimes, crime-lab facilities, and training are each produced by a single unit. St. Louis County's Major Case Squad is a criminal investigation unit staffed by officers on assignment from their home departments in the county; the county sheriff's department performs this function in Allegheny County. As often true elsewhere, crime-lab services are produced by a county police or sheriff's department (or by state police). The metropolitan police academies that integrate training in St. Louis and Allegheny Counties are an increasingly common arrangement for producing entry-level and in-service training (see E. Ostrom, Parks, and Whitaker 1978 for an overview of service arrangements in 80 metropolitan areas).

Similar arrangements exist for the production of fire protection. The structure of fire protection in Allegheny County relies heavily on volunteer fire companies, as discussed above. The number of fire suppression "producers" actually exceeds the number of public fire protection "providers." There is often more than one volunteer fire company per municipality, dividing the municipal jurisdiction between them.

The service production structures for police and fire protection are built from the bottom-up, not superimposed from the top-down. Countywide organizations of police chiefs and fire chiefs are usually the major forum, supplemented by county municipal leagues, for discussing problems and creating new organizational arrangements. If a new arrangement requires state legislation, the chief's organization solicits support from the county's legislative delegation. This process is facilitated in St. Louis County by the legislature's practice of enacting what is in effect "special legislation" for St. Louis County.

Production arrangements in public education deviate from this pattern in the case of Allegheny County. While support services such as audio-visual services and joint purchasing are integrated in a single unit in both counties, the pattern of organization in Allegheny County consists of production by the Allegheny Intermediate Unit, one of several such units created by state government throughout Pennsylvania. Intermediate units also produce special-education services. Local school districts are required to contribute to the funding of intermediate units according to a state formula. The units are governed, however, by boards elected by the members of local school district boards. Schools are not required to use an intermediate unit's services, and a few districts make their own arrangements. In St. Louis County, similar support services are produced by an organization called Cooperating School Districts, an association in which membership, while voluntary, is also widespread. Special education in St. Louis County is both provided and produced by a countywide special district; however, many special district personnel work in regular district schools. The special district also provides and produces vocational-technical education; in Allegheny County, this service is produced largely through "jointures," cooperative arrangements created—from the bottom-up—by interlocal agreements among school districts to operate regional vocational-technical schools.

The most striking feature of these service production structures is their similarity across three functions and two states. Provision tends to be highly differentiated, often making use of very small jurisdictions. Production of direct services is less highly differentiated, but is still very reliant on a relatively large number of small agencies. Indirect or support services, as well as more specialized direct services, are much less differentiated and in many cases are fully integrated in a single organization. These structures are closely related to the economics of service production. Service components that benefit more from economies of scale in production are produced by fewer, larger units, while service components that benefit less from economies of scale are produced by a greater number of smaller units. This is a consistent pattern, but one that is found only where the base of the structure consists of relatively small jurisdictions, as in much of suburban America. Where the base of the structure is a large jurisdiction, such as a central city or in some cases a suburban county, the production structure tends to be much less differentiated vertically, that is, the same production units produce more components of each service regardless of differences in scale economies. By contrast, the organizational arrangements found in suburban America more closely resemble the market-based patterns of industrial organization found in the private sector (see V. Ostrom and E. Ostrom, 1965).

Measuring structural effects on efficiency

Roger B. Parks (1985) has studied the effects of production structure on the efficiency of police production, utilizing data from a study of 76 metropolitan areas (SMSAs) in the U.S. He focused on the relative technical efficiency with which police departments in each SMSA transform resource-inputs into two outputs: (1) number of officers on the street and (2) number of reported crimes cleared by arrest. Structural characteristics were measured along these dimensions: (1) relative agency dominance in (a) homicide investigation and (b) radio communications (dispatch) and (2) the multiplicity and autonomy of police patrol producers. His analysis found the *highest technical efficiency* in SMSAs that exhibited *high relative dominance* in both homicide investigation and radio communications combined with *high multiplicity and autonomy* of patrol producers. By the same token, he found the *lowest technical efficiency* in SMSAs characterized by *low relative dominance* in homicide investigation and radio communications combined with *low multiplicity and autonomy* of patrol producers. Production structures like those described above for St. Louis and Allegheny Counties outperformed the more conventional type of structure in which a few large departments produce both direct and indirect service components in-house.

Capital-intensive service structures

The direct services associated with police, fire protection, and public education are labor-intensive; that is, expenditures tend to be dominated by personnel costs. Some direct services, however, are capital intensive, for example, public works such as streets and sewers. Theoretically, such services should exhibit different production structures.

As an illustration, consider sanitary wastewater collection and treatment. The author has studied a variety of arrangements for providing and producing these services in DuPage County, Illinois, a suburban county located in the Chicago metropolitan area, where three major patterns are found: (1) municipal collection and treatment; (2) municipal collection and special-district (or in some areas county) treatment; and (3) special-district collection and treatment (see Oakerson 1991). With a few exceptions, DuPage municipalities tend to be smaller than needed to capture fully the economies of scale associated with treatment. Many municipalities nevertheless operate their own treatment plants. However, a number of municipalities are served by treatment plants operated by overlying special districts or by county government, while each municipality retains responsibility for collection. Special districts tend to provide both collection and treatment in unincorporated areas and, in one case, a special district provides both collection and treatment for its entire jurisdiction, including municipalities.

The latter is the only arrangement likely to take advantage of economies of scale in treatment and at the same time fully internalize the benefits of sewer line maintenance in a single agency. Water inflow caused by inadequate sewer line maintenance significantly increases the costs of treatment. Where collection and treatment are organized by separate jurisdictions, the benefits of sewer line maintenance do not accrue fully to the agency responsible for maintenance. The externality can also be avoided if the treatment agency measures the flow of wastewater from the collecting jurisdiction and charges the collection agency for the flow, rather than separately billing consumers.

In terms of charges to residential users, the most expensive service arrangement in DuPage County tends to be divided responsibility for collection and treatment between municipalities and districts (or county government), followed closely by integrated municipal (or county) collection and treatment. The least cost arrangement appears to be integrated special-district collection and treatment organized on a regional basis (Oakerson 1991).

Sanitary wastewater services illustrate economies of scale related to a direct service (although treatment might also be considered an indirect service supplied to collection producers). Note that the effect of size depends on both function and structure. Somewhat larger units are required to reach an efficient scale of production for sanitary wastewater collection and, in particular, treatment, than is required in the production of police patrol or fire suppression: this is the influence of function. The availability of special districts (or other overlying organizational arrangements) enables small municipalities to be more efficient overall because of their ability to shed functions such as sanitary wastewater collection and treatment: this is the influence of structure. Given this pattern of variation, special-purpose districts are a useful institutional device whereby relatively small jurisdictions can gain access to larger scale organization for the provision or production of selected services.

Structural effects on equity

One of the concerns often voiced about highly differentiated provision, involving numerous, relatively small jurisdictions, is inequality in their ability to raise revenue. Without question, such differentiation can yield some jurisdictions with great wealth and leave others in poverty. Tax base, however, does not always correlate highly with personal income. The greatest source of variation in municipal revenues in St. Louis County is variation in the commercial and industrial property tax base (see ACIR 1988. p. 124). Revenue inequalities, while present, do not correlate well with median household income, poverty rate, or racial composition; residential tax burdens, however, tend to be greater in jurisdictions with greater numbers of poor, non-white, and elderly residents (ACIR 1988, p. 126). Tax diversification, which allows local jurisdictions to draw on diverse sources of revenue, tends to reduce these inequalities, but is usually more characteristic of municipal organization than other types of local government.

The degree of inequality is frequently dramatized by focusing on the "range" between the most extreme cases, a statistic measured by the difference between the richest and poorest jurisdictions. Indicators based on other measures of dispersion, such as the standard deviation, also should be examined to get a fuller picture. For example, Table 5 shows the per-pupil expenditures of the highest and lowest spending school districts in St. Louis and Allegheny Counties. The range is quite large. The percent of students within a single standard deviation from the mean, however, is over 70 percent in both counties. The shape of the distribution is not primarily bimodal; rather, the majority of students reside in districts that cluster about the mean. The effect of the overall structure of provision is not one that divides suburban populations sharply into rich and poor, even though there may be rich and poor enclaves deserving of critical attention.

Table 5. Measures of dispersion of per-pupil spending by school districts in St. Louis County and Allegheny County outside Pittsburgh, 1985

	St. Louis	Allegheny
Lowest district	$2,544	$2,990
Highest district	7,005	5,881
Range	4,461	2,891
Mean	3,909	4,020
Standard deviation (SD)	746	478
Percent of student population within one SD	79.5	71

Source: ACIR 1988, pp. 101, 103; 1992, pp. 63-63.

A larger, unanswered question concerning service equity is whether differentiated provision, characteristic of suburban areas, is more or less likely than integrated provision, characteristic of large central cities, to result in significant disparities in actual service production and delivery among neighborhoods, in addition to yielding differences in revenues and expenditures. Expenditures are inputs to production; in the final analysis, equity depends on the distribution of service outputs in combination with tax prices. Systematic research is needed to compare the service equity results of differentiated provision among small municipalities with those of integrated provision by central cities or urban counties.

Moreover, local jurisdictions are nested in county, state, and federal jurisdictions, all of which, to some extent, are active redistributors of revenues. For this reason, it is important to consider whether smaller or larger jurisdictions are better recipients of grants-in-aid intended to redress inequities. One of the typical functions of local provision units is to receive and spend grant assistance. It is plausible that better "targeting" of grant assistance to needy communities can be achieved where poor communities are organized as autonomous public jurisdictions able to receive and spend public funds.

Summary and conclusion: Applications to rural America

Distinguishing "provision" and "production" allows for different criteria to be used in deciding upon the appropriate size and structure of organizational arrangements. The basic principle of provision is representativeness—the idea that jurisdictions should match the relevant community of interest as defined both by subjective preferences and objective conditions. Although exact matches are not feasible, it is clear that the fit can be better or worse. Although size of jurisdiction is a relevant consideration, it is the fit that matters, not size *per se*. The choice of size depends on the set of problems or services at issue. Rather than seeking a single, optimal size, the general solution to the provision problem is to make available a variety of potential jurisdictions, many created at local discretion with flexible boundaries, some of which can overlap. This is the basic approach taken by the 50 states, although in various degrees.

The basic principle of production, however, is efficiency. In particular, the optimal size of a production unit depends on its ability to capture economies of scale. The advantages of scale, however, are not unlimited. Bigger is not always better on the production side either. Different services are associated with different lower size thresholds and upper size limits. Rather than seeking a single optimal size, the general solution to the production problem is to allow provision units to make diverse production arrangements that include in-house production, contracting, and cooperation among the menu of possibilities.

Although the effect of size is contingent on other variables, some important empirical generalizations are possible.

- Very small jurisdictions are potentially viable as provision units for many common local services. Inability to produce efficiently does not preclude effective provision.
- The efficiency of direct service production is frequently subject to upper size limits that are well below the size required for a single agency to serve a large central city. This has been well documented in police patrol services and, to a somewhat lesser extent, in public education.
- Indirect service components (support services) frequently benefit from economies of scale that go beyond the scale at which most direct services are best produced. Likewise, some direct services—those that tend to be more capital-intensive—benefit from greater economies of scale than other, more labor-intensive services.

The effect of size depends on function—in terms of provision or production and production of what—in ways that are predictable.

Because the effect of size depends on function, it also depends on the structure of the local public economy. The viability of small jurisdictions as provision units depends on the availability of larger production units, as well as overlying provision units that organize larger communities of interest. The efficiency of relatively small producers of direct services depends on the availability of larger scale producers for selected service components. Small jurisdictions able to perform well in the context of one structure may not perform as well in others.

The structure of local public economies in suburban and rural areas depends in large part on state rules that pertain to the formation and the modification (i.e., annexation, consolidation, separation) of local jurisdictions (Oakerson and Parks 1989). Of particular importance is the "default unit" of local government, that is, the jurisdiction that has primary responsibility for a local community if no other local unit (such as a village or city) is created. In many states, especially in the North East, the default unit is a township; in other states, especially in the South and West, the default unit is a county. Counties tend to be much larger than townships. Also of relevance is the presence or absence of unincorporated territory. Frequently, townships have the status of municipal corporations. Finally, the variety of so-called general purpose and special purpose local governments that can be created at local initiative is a major institutional factor affecting the structure of local public economies.

Given a set of rules that offer various institutional and jurisdictional options, local communities can be trusted to make their own choices, weigh the factors involved, and make their own tradeoffs, as long as state-supplied fiscal rules do not distort the decision-making process and lead local communities to sustain inefficient arrangements. Local communities should face realistic cost calculations in making size-related decisions, but forcing localities to bear all of their costs locally can create or sustain inequities, as discussed above. However, it is the form in which aid is distributed to local jurisdictions, not the amount of aid, that can distort local decisions. Some state grant formulas in effect reward higher local expenditure by sharing the cost of spending increases. Lump-sum grants based on a jurisdictional means-test can avoid this tendency to distort local decisions at the margin by requiring that increases beyond

some base be funded entirely by local dollars (see Parks and Oakerson 1990). State agencies should avoid creating incentives for inefficient behavior that they then seek to regulate.

Rural communities encounter distinctive problems and opportunities in the provision and production of local public services. Low population density decreases demand for some local services as it increases the costs of producing certain services. A relatively low demand for police services may combine with a relatively high per capita cost of producing police patrol; response times are almost certain to be higher in rural areas, although the frequency of calls may be lower. There is no reason to believe that the demand for public education, however, would be any lower in a rural area, and costs of transportation to and from school are almost certain to be higher. In general, rural areas face a somewhat different set of tradeoffs in organizing local services than do urban areas.

On the provision side, low population density may actually lead to distinct communities of interest that are smaller in population size. Relatively small size jurisdictions measured by population may not tend to exhibit homogeneity of preferences if the population is widely scattered across a large area. Even relatively small school districts in rural areas, for example, may not tend to have relatively homogeneous student populations if they are drawn from different communities that are located some miles apart. The result is a larger number of smaller communities of interest to be represented in the provision of services.

On the production side, it is the relatively small size of the local public economy in rural areas, not the small size of jurisdictions, that may limit the ability of rural communities to achieve the most efficient scale of service or service-component production. In metropolitan areas outside central cities, a large number of small jurisdictions function in the context of a large public economy—St. Louis County and Allegheny County outside Pittsburgh each have roughly 1 million residents. The size of the local public economy increases the potential complexity of its service production structure and thus increases the possibilities for locating or creating service producers who can operate at diverse scales. A smaller public economy in a given locality yields less complexity and a diminished ability to operate at diverse scales of production.

In these circumstances, consolidation of jurisdictions offers no solution to the service production problems of many rural areas. The existence of numerous small jurisdictions is not a formidable barrier to the creation and operation of efficient production arrangements, if there is sufficient scale in the local public economy. The consolidation of jurisdictions cannot create population scale—a function of density—where it is absent. Rural communities are more likely to look toward part-time or volunteer labor, or to less specialized modes of production, as ways of achieving economies in the production of services. At the same time that it fails to generate efficiencies, jurisdictional consolidation can, by mixing different communities of interest together, diminish the ability of local communities to act collectively in relation to common problems. Large rural jurisdictions may be less able to sustain the relationships of trust and reciprocity among community members that create valuable social capital, which is often a key factor in the production of services by agencies of education, social assistance, and social control. Absent distorting fiscal rules, local communities are competent to make their own decisions on jurisdictional formation and consolidation, without efforts from state or federal agencies to prod them in one direction or another.

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